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ABSTRACT

Two papers on the funding formula of the Alabama Commission for Higher Education are presented. The first paper, by John F. Porter, Jr., "The Origins and Evolutions of the Funding Formula Model Utilized by the Alabama Commission on Higher Education, 1973-82," presents the historical antecedents for the existing formula elements and notes similarities between the formulas used by Alabama and Texas. The formula and model used in generating the "formula-driven" components of the 1973-1975 biennial appropriations recommendation are considered, and a case study for change in the state is presented. The second paper, by John P. Porter, Jr. and Glenna G. Brown, "A Method for Evaluating Funding Formulae" assesses regular academic program funding formulas used in 1982. The following four evaluation criteria are developed: level of funding, distribution by category of institution, distribution by size of institution, and internal distribution. In addition, the formulas of Alabama and five other Southern States are applied to the 1982-1983 database for each of the 13 senior institutions in Alabama. Alabama's formula is considered a very conservative estimate of the funds needed by institutions when compared with other states. (SW)

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AGENCY STATEMENT

No activity of the Alabama Commission on Higher Education is of more intense interest to the public colleges and universities of Alabama than the preparation of the annual budget requests. Support for the senior universities' regular academic programs constitutes the largest portion of the budget.

Since 1972, the Commission's funding formula has been the principal influence in the development of the recommendations for the regular academic programs.

For this reason the formula, often the hope and sometimes the despair of the universities, is frequently criticized and evaluated.

These occasional papers deal with the formula from two aspects. The first focuses on the origin and evolution of the Alabama funding model from 1973 to 1982 and is a useful addition to the files of Alabama's budget officers and institutional planners. The historical antecedents for the existing formula elements are presented in the sequence they occurred and were made part of the public record.

The history also provides a case study for change in the state, and, as such, will be of interest to students of higher education and state agency analysts.

The second paper, a method of evaluating funding formulae, was commissioned in support of an effort by the Alabama Commission on Higher Education to provide a critical assessment of the regular academic program funding formula used in 1982. Co-authored by Dr. Glenna G. Brown, the paper presents useful background on the concept of formula funding and on approaches to the validation of formulas.

The paper applies the formulas of Alabama and five other southern states to the 1982-83 data base for each of the senior institutions in the state.

Results generally indicate that the Alabama formula proposes fewer dollars for institutions in the doctoral I and II category and master's III category than the formulas of the five other southern states. Alabama's formula is considered a very conservative estimate of the funds needed by the institutions for the regular academic programs when compared with other states.

Dr. John Porter is uniquely qualified to prepare these papers. Presently a professor of higher education at the University of Alabama, he served as the first deputy executive director of the Commission from September 1972 to October 1973 and as executive director from October 1973 to October 1981.

The Alabama Commission on Higher Education is pleased to present these reports as part of a new series of occasional papers on higher education.

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The Origins and Evolutions of the Funding Formula Model Utilized by The Alabama Commission on Higher Education 1973-82

John F. Porter, Jr.

The University of Alabama

September, 1982

Abstract

The origins of the funding formula and model used by the Alabama Commission on Higher Education in generating the "formula-driven" components of the 1973-75 biennial appropriations recommendation are presented. The heritage due the then current formula of the Texas Coordinating Board is noted as are the clear similarities between the two formulas. The evolution of the individual formula elements used in Alabama over the period 1973-1982 are traced and presented and also included in summary, tabular form.

Introduction

"Formula budgeting" or "formula allocations" are terms used to describe various quantitative methods for predicting the funds necessary for the current operating costs (Operations and Maintenance) of an institution or system of institutions of higher education. Such quantitative methods are based on models of the institution that describe the general functions of the institution and, to varying degrees, the unique features of each institution.

In theory any logical process of arriving at a predicted cost of current operations can be reduced to a quantitative process or model and a "formula" developed. This is equally true for incremental budgeting, fixed-variables cost budgeting, zero-based budgeting, and program-based budgeting. More recently, however, the term "formula" has referred particularly to enrollment-driven, zero-based processes. It is in this sense that the term "formula" is used in this paper.

Although one frequently hears of "the formula," the processes are more accurately several formulae that collectively represent a financial model of an institution. Although research and service are usually included with instruction as primary functions, instruction is universally the largest component and is driven by factors that recognize differences in cost according to subject matter and level of instruction. Supporting services, including libraries, academic administration, general administration, student services, plant O&M, etc., are included with varying degrees of sophistication in their treatment.

At last count, roughly half the states were using a formula approach to the funding of higher education.[1,2] Within the southern region twelve of fourteen member states of the Southern Regional Education Board (SREB) were included in that group.[3] Some 26 years earlier (1951) only four states used such a process and by 1963 only two more had joined that group.[1] The great increase in the use of formulas occurred in the last fifteen years.

The earliest effort at formula based funding for higher education in Alabama occurred in 1965 when the State Board of Education adopted a formula for the allocation of the Junior College Equalization Account.[4] The same year the appropriations act specified that the Teacher Training Equalization Account "be distributed in accordance with a formula adopted by the State Board of Education" among the "State Colleges at Florence, Jacksonville, Livingston, and Troy."[5] In 1966-67 voluntary cooperative efforts expanded the scope informally to all of higher education in Alabama.

1. Francis M. Gross, "Formula Budgeting and the Financing of Public Higher Education: Panacea Nemesis for the 1980's," The Association of Institutional Research Professional File, Fall 1979, No. 3 (Tallahassee, Florida)

2. Francis M. Gross, A Comparative Analysis of the Existing Budget Formulas Used for Justifying Budget Requests or Allocating Funds for the Operation Expenses of State-Supported Colleges and Universities: A Dissertation Summary, Office of Institutional Research, The University of Tennessee (Knoxville, Tennessee, 1973)

3. David S. Spence, Formula Funding in the SREB States, Southern Regional Education Board (Atlanta, Georgia, 1978)

4. Minutes, State Board of Education, Nov 2, 1965

5. Acts of Alabama, Special Session, 1965, Act No. 244

It was not until after the Alabama Commission on Higher Education was created in 1969[6] that a formal statutorily sanctioned effort towards formula funding for all of higher education was initiated. The Commission staff, limited by a small start-up appropriation, concomitantly small staff, and an inadequate data base, attempted without success to develop a formula based funding recommendation for the 1971 session of the Legislature. In 1972, with an increased appropriation, the Commission staff was enlarged and a renewed effort exerted to develop a formula for generating funding recommendations for the universities. These efforts culminated in the adoption of a formula based recommendation by the Commission on March 16, 1973, for the 1973-75 biennium.

It is the purpose of this paper to describe the origins of the formula for the universities adopted in 1973 and the evolution of the formula and model over the period 1973-82. These developments are summarized in Appendix A.

6. Acts of Alabama, Special Session, 1969, Act 14

The 1973 Formula[7]

The formula adopted by the Commission in 1973 for generating the 1973-75 biennial recommendation was adapted from that used by the Texas Coordinating Board for the 1971-73 biennium. The Texas Coordinating Board had, in 1965, been statutorily mandated to develop formula elements for use by the governor and Legislative Budget Board in making appropriations recommendations to the Texas legislature. The Coordinating Board adopted a committee structure to develop recommendations on each of the formula elements. The Board's actions were required to be presented to all interested parties by March 1 of every even-numbered year. In the "Designation of Formulas"[8] adopted by the Coordinating Board on February 6, 1970, seven formula elements were designated: (1) General Administration and Student Services; (2) Faculty Salaries; (3) Departmental Operating Expense; (4) Library; (5) Organized Research; (6) Building Maintenance; (7) Custodial Services. Other items of current operating costs such as General Institutional Expense, Staff Benefits, Extension and Public Service, Instructional Administration, and Utilities were identified and subject to committee study and recommendation. The Coordinating Board, however, chose to leave these items for individual justification by each institution. It was from the above document that the major portion of the Alabama formula was adopted with some change. The formula elements used in Alabama and the relationship to the Texas elements are described below.

7. "Recommended Unified Budget for Post Secondary Education by Spending Units, 1973-75 Biennium," Alabama Commission on Higher Education (Montgomery, AL, 1973)

8. Designation of Formulas, Coordinating Board, Texas College and University System (Austin, Texas, 1970)

1. Salaries for Instruction and Departmental Research

The Texas formula funded credit hours produced at differential rates by subject matter and level of instruction. Rates per semester credit hour were derived from average faculty salaries, class sizes and faculty work loads as a function of subject matter and level. Credit hours, aggregated by subject and level, were multiplied by the appropriate rates and summed to arrive at the total amount recommended for instruction and departmental research salaries. The rates used for Texas FY 1973 are displayed in Table 1.

TABLE I
TEXAS
FORMULA FOR FACULTY SALARIES
Public Senior Colleges and Universities
1971-73 Biennium

	Fiscal Year 1973 Rates Per Base Period Semester Credit Hour			
Program	Under-Graduate	Masters	Special Professional	Doctoral
Liberal Arts	$16.99	$45.65	$	$167.16
Science	18.17	80.44		240.70
Fine Arts	32.87	73.13		242.37
Teacher Education	15.88	37.89		143.28
Teacher Education-Practice Teaching	35.26			
Agriculture	23.60	65.94		211.72
Engineering	29.87	82.53		240.70
Home Economics	22.41	52.43		157.87
Law			29.26	
Social Service	25.18	75.22		
Library Service	17.84	53.19		
Veterinary Medicine			74.95	
Vocational Training	16.72			
Physical Training	16.11			
Nursing	45.97	72.83		
Pharmacy	29.13	74.17		242.37
Business Administration	18.12	50.15		229.56
Optometry			40.65	
Technology	24.74			

The Alabama process derived a set of weighting factors from the Texas rates by taking the lowest rate (Liberal Arts) and dividing all other rates by this rate (a normalizing process). The credit hours, aggregated by subject and level, were multiplied by the appropriate weighting factor and then summed to arrive at a total weighted credit

hour production. The total weighted credit hours, when multiplied by the lowest rate (instructional multiplier), produced the total recommendation for instruction and departmental research.

Table 2 shows the instructional weighting factors used in Alabama for the 1973-75 formula and the derived ratios from Texas. The instructional multiplier for 1973-75 used in Alabama was $17.00, which compares to the $16.99 rate for undergraduate Liberal Arts in Texas. Similar degrees of consistency are found throughout Table 1, most variances being within a rounding error. Table 3 shows the HEGIS category assignment of the academic subdivision groupings.

TABLE 2
WEIGHTING FACTORS FOR SALARIES FOR INSTRUCTION AND DEPARTMENTAL RESEARCH USED IN ALABAMA AND TEXAS RATIOS FOR 1973

Academic Subdivision Groupings	WEIGHTING FACTORS					
	Undergrad.		Grad. Level I		Grad. Level II	
	Texas	Ala.	Texas	Ala.	Texas	Ala.
1. Business	1.07	1.06	2.95	3.03	13.51	13.53
2. General	1.00	1.00	2.69	2.68	9.84	9.88
3. Education	0.93	1.00	2.23	2.24	8.43	8.47
4. Nursing, Health	2.71	2.71	4.29	4.28	-	-
5. Engineering	1.76	1.76	4.86	4.85	14.17	14.12
6. Fine Arts	1.93	1.94	4.31	4.29	14.27	14.24
7. Home Economics	1.32	1.32	3.09	3.09	9.29	9.29
8. Science	1.07	1.07	4.73	4.74	14.17	14.12
9. Military Science	-	-	-	-	-	-
10. Law	-	-	1.72	1.76	-	-
11. Architecture	-	1.47	-	4.12	-	12.94
12. Agriculture	1.39	1.39	3.88	3.88	12.46	12.41
13. Veterinary Medicine	-	-	4.41	4.41	17.14	17.13
14. Pharmacy	1.71	1.76	4.37	4.41	14.27	14.23
15. Interdisciplinary	-	1.20	-	3.21	-	-

2. Departmental Operating Expenses (D.O.E.)

These costs are the non-faculty salary support costs at the department level. Texas again differentiated by subject matter and by level. The Texas rates are shown in Table 4. The method of calculation is identical to that for instruction and departmental research salaries. In the Alabama formula weighting factors were derived, as

TABLE 3
DISCIPLINE GROUPINGS
(HEGIS Disciplines & Codes)

1. BUSINESS

   Includes 0500, Business and Management
   1600, Library Science
   2100, Public Affairs and Services
   also Undergraduate Law or Business Law

2. GENERAL

   Includes 0300, Area Studies
   0600, Communications
   1100, Foreign Languages
   1500, Letters
   1700, Mathematics
   2000, Psychology
   2200, Social Sciences
   9900, Cooperative Education

3. EDUCATION - 0800 Education

4. NURSING, HEALTH, ETC.

   Includes all of 1200, Health Professions Except
   1209, Optometry
   1211, Pharmacy and
   1218, Veterinary Medicine

5. ENGINEERING - All of 0900, Engineering

6. FINE ARTS - 1000, Fine and Applied Arts

7. HOME ECONOMICS - 1300, Home Economics

8. SCIENCE

   Includes 0400, Biological Sciences
   0700, Computer & Information Science
   1900, Physical Sciences

9. MILITARY SCIENCE - 1800, Military Science

10. LAW - 1400, Law

11. ARCHITECTURE - 0200, Architecture & Environmental Design

12. AGRICULTURE - 0100, Agriculture & Natural Resources

13. VETERINARY MEDICINE - 1218, Veterinary Medicine

14. PHARMACY - 1211, Pharmacy

15. INTERDISCIPLINARY - 4900, Interdisciplinary Studies

    5000 at Jacksonville, count as 1500
    at USA as 1200

for salaries for instruction, by dividing all rates by the lowest rate (again Liberal Arts). One major change was made before the weights were determined. The rate for Liberal Arts of $1.00 in Texas was judged to be too low and was increased to $2.00 per semester hour before the weighting factors were derived. This preserved the relationship between all other subject matter groups and affected only the Liberal Arts area. Table 5 shows the weights used in Alabama and those ratios derived from the Texas rates. The degree of consistency is not as high as for the instructional salary weights but is still clearly apparent. Aside from some arbitrary and perhaps capricious rounding, the differences are small. These differences perhaps reflect the fact that there was less confidence in the Texas ratios for D.O.E. than in their rates for faculty salaries.

TABLE 4
TEXAS
FORMULA FOR DEPARTMENTAL OPERATING EXPENSE
Public Senior Colleges and Universities
1971-73 Biennium

	Fiscal Year 1973 Rates Per Base Period Semester Credit Hour			
Program	Under-graduate	Masters	Professional	Doctoral
Liberal Arts	$ 1.00	$ 6.55	$ 6.55	$ 31.30
Science	7.52	25.04		112.69
Fine Arts	7.52	25.04		112.69
Teacher Education (Includes Practice Teaching)	3.14	6.26		25.04
Agriculture	5.65	25.04		112.69
Engineering	11.27	25.04		112.69
Home Economics	4.38	12.52		18.78
Law			2.51	
Social Service		9.39		
Library Science	3.76	6.26		
Veterinary Medicine		42.71	42.71	118.33
Vocational Training	5.01			
Physical Training	3.14			
Nursing	6.26	25.04		
Pharmacy	11.27	25.04		25.04
Business Administration	3.14	12.52		25.04
Optometry			5.65	
Technology	5.94			
Military Science	3.14			

TABLE 5
WEIGHTING FACTORS FOR DEPARTMENTAL OPERATING EXPENSES (D.O.E.)
USED IN ALABAMA AND TEXAS RATIOS FOR 1973

Academic Subdivision Groupings	WEIGHTING FACTORS					
	Undergrad.		Grad. Level I		Grad. Level II	
	Texas	Ala.	Texas	Ala.	Texas	Ala.
1. Business	1.57	1.75	6.26	6.00	12.52	12.50
2. General	1.00	1.00	3.28	3.25	15.65	15.50
3. Education	1.57	1.50	3.13	3.00	12.52	12.50
4. Nursing, Health	3.13	3.13	12.52	12.50	-	-
5. Engineering	5.63	5.63	12.52	12.50	56.35	57.50
6. Fine Arts	3.76	3.75	12.52	12.50	56.35	57.50
7. Home Economics	2.19	2.20	6.26	6.25	9.39	9.50
8. Science	3.76	3.75	12.52	12.50	56.35	57.50
9. Military Science	-	1.50	-	-	-	-
10. Law	-	-	1.25	1.58	-	-
11. Architecture	-	4.00	-	12.50	56.35	57.50
12. Agriculture	2.83	2.83	12.52	12.50	56.35	57.50
13. Veterinary Medicine	-	-	21.35	21.37	59.17	59.50
14. Pharmacy	5.63	5.60	12.52	12.50	12.52	12.50
15. Interdisciplinary	-	2.00	-	3.50	-	-

In the preceding charts two differences should be noted. Whereas Texas recognizes a differential for practice teaching at the undergraduate level, the Alabama formula does not. This was and still is caused by the lack of data on practice teaching credit hours in Alabama.

The second difference to be noted is that Texas did not have a separate rate for architecture but treated it as engineering. There is no documentation to substantiate the derivation of the weight for architecture in Alabama and no simple combination of other rates produced the weight used. Texas also had no interdisciplinary category and again there is no documentation to substantiate the Alabama weight.

3. Instructional Administration

These costs relate to those instructional administrative costs incurred above the department level and below the central administrative structure, the level of deans and directors. In the Texas process requests for this purpose were outside the formula area and were individually justified. The Alabama formula used a modification of the committee recommendation from Texas. That committee recommendation

was a complex formula yielding a variable percentage of faculty salaries for instructional administration. The variation depended on the complexity of the institution. The Alabama formula assumed a constant relationship between faculty salaries plus Departmental Operationing Expenses and Instructional Administration and set this at 5 percent, an approximation of the committee recommended value in Texas.

4. General Administration and Student Services

These costs directly relate to those of the central administration of an institution, including all student services. As such they relate more directly to total head count enrollment than the instructional load. The Texas formula component for this element consisted of three parts: (a) a rate per head count incrementally decreasing with increases in enrollment, (b) 7½ percent of sponsored research funds expended in 1970, and (c) a percentage factor of the previous year's Educational and General Appropriations exclusive of General Administration and Student Services. Alabama adopted only the graduated rate per head count enrollment. The rates adopted were somewhat higher than those in Texas, perhaps to compensate for the two other components not adopted, and are shown below:

Alabama		Texas	
Hdct. Enr.	Rate/hdct.	Hdct. Enr.	Rate/Hdct.
0 - 5,000	$100.00	0 - 4,000	$93.30
5,000 - 10,000	85.00	4,000 - 8,000	69.60
10,000+	70.00	8,000+	62.00

5. Libraries

Costs for libraries relate to the instructional load of an institution, but generally are not influenced by subject matter but by level. The Texas formula and the Alabama formula are depicted below:

Alabama		Texas	
Level	Rate/Unwtd. Credit Hr.	Level	Rate/Unwtd. Credit Hr.
U. Graduate	$ 2.00	U. Graduate	$ 2.03
Graduate 1	4.00	Mast./Sp. Prof.	4.06
Graduate 2	17.00	Doctoral	17.36
Law	11.00	Law	10.71

6. Maintenance of Physical Plant

Costs for maintenance are largely determined by the size of the plant and are generally recognized as a cost per gross square foot of space. Texas differentiated on a rate as a percent of replacement cost for three categories of construction, with, and without air conditioning. A reconstructed approximation of the rates yields a low of $0.367 and a high of $0.634 per square foot. Alabama adopted a fixed rate per gross square foot of $.30.

7. Custodial Services

These costs are also related to the size of the plant and are based on a rate per gross square foot. Texas used $0.332 per gross square foot. Alabama adopted $0.30 per gross square foot.

8. General Institutional Expenses

This item catches anything not previously included such as alumni affairs, legal services and campus wide services. In Texas this was a separately justified item in the requests. In Alabama, it was assigned a value of 2% of the sum of all of the preceding items.

9. Utilities

These costs are self-explanatory. They were not a formula item in Texas, nor were they in Alabama in the truest sense in 1973. The individual institutional estimates of these costs were used for the 1973-75 biennial recommendation.

Organized Research

In addition to the above formula elements, the Texas Coordinating Board utilized a formula for Organized Research; that is, research that is separately budgeted and funded. The Texas formula contained two elements: a differential percentage applied to faculty salaries, the differential being determined by enrollments in expensive graduate programs, and a second element of 5 percent of sponsored research funds. Seventy percent of the sum of these two elements was then the formula generated amount. Alabama did not include research in the 1973 formula.

Formula Overide

In addition to the above formula elements the Commission adopted two overriding conditions to the formula as follows:

1. No recommendation would be less than a 15% increase over 1972-73 appropriations.
2. No recommendation would exceed the institution's request.

The 1975 Formula[9]

In the preparation of the 1975-77 biennial recommendation several changes were made in the Alabama formula, some purely mechanical, some substantive.

1. Instruction

In the 1973 application of the formula, 1972 credit hours were projected forward for the years 1973-74 and 1974-75. In the 1975 recommendation a one year lag was built into the process. The 1974 fall credit hours were projected to an annualized 1974-75 basis and these projected credit hours were used in the formula calculation for 1975-76.

Beginning in 1975 only the general administrative and student services component of the formula was used for off-campus activities. It was expected that tuition and fees would cover the remaining costs of these programs.

A third more mechanical change was the merging of the separate weighting factors for instructional and departmental research salaries and departmental operating expenses and the inclusion of instructional administration in the instructional multiplier. In performing the merger of instructional salaries and D.O.E., a further significant change and departure from Texas was adopted. The new basis for the instructional multiplier was the average faculty salary for 1974-75 of SREB group I, II, III institutions inflated by 6% to reach 1975-76 ($16,206). This was divided by an assumed faculty teaching load of 570 credit hours

9. "Recommended Unified Budget for Post Secondary Education by Spending Units, 1975-77 Biennium," Alabama Commission on Higher Education (Montgomery, Alabama, 1975).

for instruction in the undergraduate, general category (class size 19, teaching load 30 semester hours) yielding an instructional salary multiplier of $28.43 per weighted credit hour. The previous D.O.E. multiplier was increased from $2.00 to $2.48 yielding a sum of $30.91 for the general category. Using these figures and the Alabama weighting factors from Tables 2 and 5 for 1973, the following equation yields the 1975 combined factors shown in Table 6:

$$\text{Combined Weighting Factor (1975)} = \frac{\$28.43 \times \text{FSWF} + \$2.48 \times \text{DOEWF}}{\$30.91}$$

FSWF = Faculty Salary Weighting Factor (1973)
DOEWF = Departmental Operating Expense Weighting Factor (1973)

TABLE 6

WEIGHTING FACTORS (1975)

Academic Subdivision Groupings	Under-Graduate	Graduate Level 1	Graduate Level 2
1. Business	1.12	3.27	13.45
2. General	1.00	2.73	10.33
3. Education	1.04	2.30	8.79
4. Nursing, Health	2.74	4.94	17.60
5. Engineering	2.07	5.46	17.60
6. Fine Arts	2.09	4.95	17.71
7. Home Economics	1.39	3.34	9.31
8. Science	1.29	5.36	17.60
9. Military Science	0.12	-	-
10. Law	-	1.75	-
11. Architecture	1.67	4.79	16.52
12. Agriculture	1.51	4.57	16.03
13. Veterinary Medicine	-	5.77	20.53
14. Pharmacy	2.07	5.06	14.09
15. Interdisciplinary	1.26	3.23	10.33

The rate of 5 percent for instructional administration was retained and added to the combined faculty salary and D.O.E. rate yielding an instructional multiplier of $32.46 for 1975. As in 1973, the credit hours for each institution, aggregated by subject and level, multiplied

by the appropriate new weighting factors and summed, yielded the total weighted credit hours. The weighted credit hours when multiplied by the new instructional multiplier yielded the total instruction-related formula-generated amount.

It is important to note that the change to the SREB regional average salary was a significant move to tie the formula to an external standard, a regional average, and away from a Texas figure. The retention of the weighting factors was an assumption of the continued validity of the relative costs expressed in the Texas figures. The use of the regional average salary did however generate problems subsequently to be discovered which will be discussed in the 1981 formula.

2. Research and Public Service

As noted earlier the 1973 Alabama formula did not include organized research although Texas had such a formula element. Rather than follow the complex formula from Texas, Alabama simply added an amount of 1 percent of instruction for research and public service to provide funds for new efforts in these areas. Existing, separately identified line items for specific items of research and public service were not included in this item.

3. Academic Support (Libraries) (previously Libraries)

The previous rates per unweighted credit hour by level were all increased by the same amount, 18.5 percent.

4. Student Services and General Institutional Support

Included in this item were several treated separately in 1973.

(a) General Administration and Student Services

These functions were treated as in 1973; however, Alabama changed back to the Texas figures for enrollment breakpoints, and 1973 rates for Texas were inflated by 31 percent. There was, however, no move to include the elements related to previous years' Education and General expenditures nor sponsored research, as was done in Texas.

(b) Maintenance of Physical Plant and Custodial Services

These two were merged since the base factor (gross square feet) was the same. The combined rate was $.94/gr. sq. ft. for 1937.

(c) General Institutional Expense

As in 1973 this item was 2 percent of the sum of all previous elements.

(d) Utilities

For 1975 Alabama used 85 percent of each institution's estimated expense for utilities.

5. Adjustment for Tuition and Fees

Beginning with the 1975-77 biennial recommendation, estimated tuition revenue was deducted from the total amount generated by the above formula elements. Analysis of the Higher Education General Information Survey - Financial Statistics (2300-4) reports for FY '74 showed tuition and fee revenues to be 23.4% of total expenditures for functions comparable to the elements of the above formula. The Commission therefore deducted 23.4% from the amount generated by the formula for each institution.

The 1976 Formula[10]

The 1975 session of the Alabama Legislature brought a constitutional change to annual sessions of the Legislature. There was then a surprising windfall, an unappropriated balance of revenues (surplus), accumulated over a biennium and available for appropriation in one year. In spite of many warnings that the expenditure of the full surplus for one year, 1975-76, would lead to a decrease in the revenues available the following year, 1976-77, the temptation proved irresistible. The 1975-76 appropriations to all of higher education exceeded the Commission's recommendation by almost 10 percent. Revenues for 1976-77 were not expected to reach the level of the previous year's appropriations. Faced with these circumstances, the Commission, which had earlier developed a recommendation of "real need" calling for an almost 20 percent increase for all of higher education, adopted a "minimum critical needs" recommendation calling for a 5.2 percent increase. As part of the "critical needs" budget, the following changes were made in the Alabama formula:

1. Instruction

Again, the average faculty salary for 1974-75 as determined from SREB Category I-III institutions was used as the base. This figure was inflated by eight percent for FY76 and six percent for FY77. In the face of the "critical needs" situation the faculty work load was increased from 570 credit hours to 630 by changing average class size from 19 to 21. The Departmental Operating Expense component was obtained by increasing

10. "Recommended Unified Budget for Post Secondary Education by Spending Units, 1976-77 Fiscal Year," Alabama Commission on Higher Education (Montgomery, Alabama, 1976)

the 1975 figure of $2.48 by the six percent inflation factor yielding $2.63. Instructional Administration was again five percent of the sum of salaries and D.O.E.. The composite instructional multipler was then $31.40 per weighted credit hour as compared to $32.46 for the previous year.

2. Research and Public Service

The amount for undifferentiated Research and Public Service in the formula was increased from one percent of instruction to three percent. Concomitantly in the "critical needs" mode the Commission approved no new differentiated (line item) programs of research or public service and recommended zero funding for such lines in the 1975-76 appropriation which had not been approved by the Commission.

3. Academic Support (Libraries)

These elements were increased by six percent over the 1975 values.

4. Student Services and Institutional Support

a. General Administration and Student Services

The 1975 values were inflated by six percent.

b. Maintenance of Physical Plant and Custodial Services

The 1975 rate of $.94/gr. sq. ft. was increased to $1.50.

c. General Institutional Expense

The same two percent factor was applied to the sum of the preceding elements.

d. Utilities

Actual 1974-75 costs/gr. sq. ft. were inflated by 10 percent for 1975-76 and 10 percent for 1976-77. These figures recognized the impending accelerating increase in utility costs above inflationary rates.

5. Tuition Adjustment

Actual tuition and fees collected for 1974-75 were determined to be 25.4 percent of the total Educational and General Current Fund expenditures. Recognizing that the financial crisis might require tuition increases, the Commission deducted 26 percent of the formula generated amount.

Formula Override

As an override to the above changes in the formula the Commission adopted the policy that, regardless of the formula generated amount, no institution should receive an amount less than the 1975-76 appropriation. This override determined the recommendation for eight of the fourteen institutions.

The 1977 Formula[11]

1. Direct Instruction and Departmental Operating Expenses

The base factor for this component was the 1975-76 average Alabama faculty salary for institutions in SREB Groups I-III, inflated by six percent for 1976-77 and 5.2 percent for 1977-78 ($17,844). The faculty workload was decreased from 630 credit hours in the 1976 "critical needs" formula back to the earlier level of 570, providing a faculty cost factor of $31.31 per credit hour. The D.O.E. component was increased 5.2 percent for inflation to $2.77. For the first time an increase of three percent was added for merit and promotion. The composite instructional multiplier was $35.10 per credit hour (general, undergraduate).

2. Academic Support (previously Instructional Administration)

This element was separately identified again in 1977 at the same rate, five percent of instruction, as in previous years.

3. Research and Public Service

Though still combined in one element the rate was increased to four percent, two percent for each. The rate applied to the sum of items 1 & 2.

4. Library Support (previously Academic Support (Libraries))

The factors were increased 5.2 percent for projected inflation.

5. Student Services and General Institutional Support

a. General Administration and Student Services

The previous breakpoint for enrollment at 4,000 was revised downward to 1,000, and the increments changed as shown below:

11. "Recommended Unified Budget for Post Secondary Education by Spending Units, 1977-78 Fiscal Year," Alabama Commission on Higher Education (Montgomery, Alabama, 1977)

1976		1977	
Hdct. Enr.	Rate/Hdct.	Hdct. Enr.	Rate/Hdct.
0 - 4,000	$129.33	0 - 1,000	$160.00
		1,000 - 2,000	136.00
		2,000 - 4,000	124.05
4,000 - 8,000	96.47	4,000 - 8,000	101.47
8,000 +	86.91	8,000 +	91.43

This change, to recognize diseconomies of scale for small institutions, had no effect, other than an inflationary adjustment, on the nine institutions with enrollments greater than 4,000. For the five institutions with enrollments less than 4,000, the effect was more pronounced, but only markedly so for the two with enrollments less than 2,000.

b. Maintenance of the Physical Plant and Custodial Service

This element was increased by 5.2 percent for projected inflation.

c. General Institutional Expense

This element remained at two percent of the sum of preceding elements.

d. Utilities

This element was again based on actual cost per gross square foot for 1975-76 inflated by 10 percent for 1976-77 and 10 percent for 1977-78, multiplied by projected education and general square feet for 1977-78. Accelerated inflation rates were again used in recognizing utility rate increases above the general inflation rate (CPI).

6. Tuition Adjustment

The basis for this adjustment was changed from a percentage of Education and General Revenues to the average tuition collected. For the 1977-78 recommendation this was $18.53 per unweighted credit hour.

The 1978 Formula[12]

1. Direct Instruction and Departmental Operating Expenses

The faculty salary component was based on the 1976-77 regional average faculty salary (SREB category I-III institutions) inflated six percent for 1977-78 and six percent for 1978-79. The departmental operating expense component was also inflated by six percent. The three percent increment for merit and promotion, initiated the previous year, was retained. The composite instructional multiplier was $37.02 per credit hour (general, undergraduate).

2. Academic Support

No change.

3. Research and Public Service

No change.

4. Library Support

The support factors for libraries were increased as shown below (rate per credit hour).

	1977	1978
U. Graduate	$ 2.66	$ 3.26
Graduate 1	5.34	6.60
Graduate 2	22.84	28.21
Law	14.10	17.41

5. Student Service and General Institutional Support

a. General Administration and Student Services

In the continuing effort to recognize the diseconomies of small institutions, a $300,000 base was established for

12. "Recommended Unified Budget for Post Secondary Education by Spending Units, 1978-79 Fiscal Year," Alabama Commission on Higher Education (Montgomery, Alabama, 1978)

institutions with enrollments less than 4,000. For institutions with enrollments greater than 4,000, a different set of factors was established. Both are shown below.

Less than 4,000 Enrollment		Greater than 4,000 Enrollment	
Hdct. Enr.	Rate/Hdct.	Hdct. Enr.	Rate/Hdct.
First 1,000	$300,000 Base	First 4,000	$170.60
1,000 - 2,500	150.96	4,000 - 8,000	127.26
2,500 - 4,000	103.98	8,000 +	114.66

b. Maintenance of Physical Plant and Custodial Services

The previous year's rate was increased seven percent, to $1.69/gr. sq. ft..

c. General Institutional Expense

No change.

d. Utilities

Actual 1976-77 cost/gr. sq. ft., increased by 25 percent for 1977-78 and 20 percent for 1978-79, were applied to projected 1978-79 gr. sq. ft. The increase in the acceleration of utilities increases again reflected anticipated rate increases well above inflation.

6. Tuition Adjustment

Ninety percent of the state average tuition per credit hour was deducted. This amounted to $16.66 per credit hour.

Program Elements

The Budget Management Act of 1976 (Title 41, Section 1-12, Code of Alabama 1975, Acts of Alabama, 1976 No. 494) required the establishment of definitions of expenditure categories. The Executive Budget

Office, Department of Finance, adopted[13] the expenditure program classification structure recommended by the National Association of College and University Business Officers (NACUBO) and the National Center for Higher Education Management Systems (NCHEMS). Although the Alabama formula elements had largely been based on earlier NCHEMS efforts in developing a program classification structure, several divergencies had occurred. The two are shown below for comparison.

ACHE	NACUBO/NCHEMS
1. Direct Instruction and D.O.E.	1. Instruction
2. Research and Public Service	2. Research
	3. Public Service
3. Academic Support	4. Academic Support
4. Library Support	a. Administration
	b. Libraries
	c. Etc.
5. Student Services and General Institutional Support	
a. General Administration and Student Services	5. Student Services
b. General Institutional Expense	6. Institutional Support
c. Maintenance of Plant and Custodial Services	7. Operation and Maintenance of the Plant
d. Utilities	

Each of the NACUBO/NCHEMS program elements converted to one or a combination of two of the ACHE formula elements except for Student Services and Institutional Support. These two in combination are

13. "Statewide Chart of Accounts," Department of Finance, State of Alabama, (Montgomery, Alabama, 1977)

equivalent to the combination of General Administration and Student Services with General Institutional Expenses.

In preparing the 1978-79 appropriations recommendation the Commission allocated the sum of the formula-generated amounts for General Administration and Student Services and General Institutional Expenses to Student Services and Institutional Support in the proportion that such funds were requested.

The formula was not changed until 1981, and then not reaching full accord with NACUBO/NCHEMS. The 1978 recommendation was the only one to present the recommendations by program element.

The 1979 Formula

On December 15, 1978, the Commission adopted a formula based unified budget calling for a 28 percent increase in state funding for 1979-80. This occurred three months into the 1978-79 fiscal year when it was obvious that the current appropriations would exceed the probable revenue.[14] This year was to be the first of three such years of proration of education appropriations to remain within revenues, a requirement of the Alabama Constitution. Governor Fob James assumed office in January 1979 and immediately began seeking means to cut expenditures in education. He sought a 10 percent reduction in state funding for higher education for 1979-80. As provided for in the Commission's enabling legislation Governor James called a meeting of the Commission on April 9, 1979, after requesting a revised recommendation at the level of a 10 percent reduction. The Commission, however, adopted a revised recommendation for level funding, the same as the 1978-79 recommendation.[15] Consequent to this action no unified budget was published for 1979-80. Staff documents provide the details of the formula used in the initial recommendation.[16] The appropriation was essentially at level funding.

14. Minutes, The Alabama Commission on Higher Education, 1978
15. Minutes, The Alabama Commission on Higher Education, 1979
16. Private Communication, Alabama Commission on Higher Education

The 1980 Formula[17]

The formula elements, except for Instruction, remained identical to those for 1978, inflated for each of two years at nine percent a year.

Instruction (formerly Direct Instructional and Departmental Operating Expense)

The basis for the instructional multiplier was the 1978-79 average SREB faculty salary adjusted for inflation by 9 percent each of two years.

The D.O.E. factor was similarly inflated and the 3 percent for merit and promotion retained. The resulting faculty multiplier was $45.86 per credit hour (general, undergraduate).

Tuition Adjustment

The tuition adjustment at 90 percent of the state average tuition charge was $19.40 per unweighted credit hour.

17. "Recommended Unified Budget for Post Secondary Education by Spending Units, 1980-81 Fiscal Year," Alabama Commission on Higher Education (Montgomery, Alabama, 1980)

The 1981 Formula[18]

Two major changes were introduced in the 1981 formula, intended to bring it into closer harmony with reality.

Beginning in 1977 there had been an increasing disparity between appropriations and Commission recommendations. In the 1980 preparation for the 1981 formula the Commission staff observed that when retirement benefits were added to the formula generated amounts the sum produced a result that was higher, on a per student basis, than the SREB regional average appropriation. The realization that the formula was producing an overstatement of need had been partially obscured by the method used for funding retirement benefits in Alabama, the Alabama Teachers' Retirement System, and Social Security. Each is appropriated in a single sum for all of education in Alabama. Although they are a "cost of doing business" they were not considered as a part of current operating costs nor included in the formula since the institutions never received the funds and had no control over their expenditure.

Although the information supplied to SREB by the Commission in the data exchange had included retirement benefits since 1976, the retrospective examination of recommended appropriations per student, including benefits, had not been done until 1980 when the above observation was clearly evident.

Figure 1 shows the trends for the ACHE formula generated recommendations, the actual appropriations and the SREB average.[19] These include benefits in all cases but do not include veterinary

18. "Recommended Unified Budget for Post Secondary Education by Spending Units, 1981-82 Fiscal Year," Alabama Commission on Higher Education (Montgomery, Alabama, 1981)

19. Derived from the Annual Data Exchange Reports for the years 1974-81

FIGURE 1

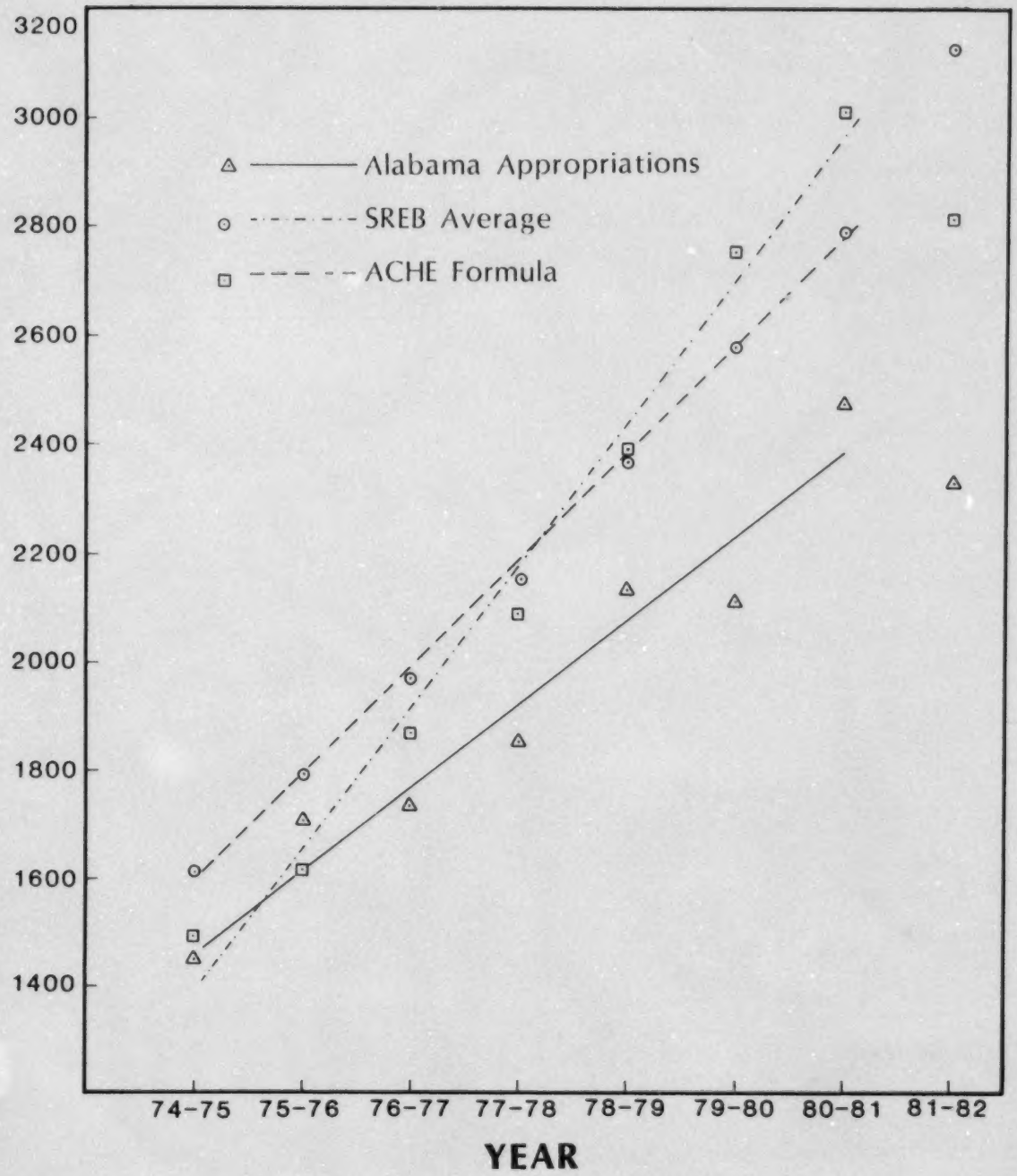
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
Alabama Appropriations
SREB Average
ACHE Formula
74-75
75-76
76-77
77-78
78-79
79-80
80-81
81-82
YEAR

Table 1
Appropriations per Full Time Equivalent Student
SREB Average; ACHE Formula Generated; Alabama Appropriated
Regular Academic Programs
$/FTE

	FY 75	76	77	78	79	80	81	82
SREB[1] Avg.	1611	1798	1970	2159	2363	2575	2788[1]	3137[1]
ACHE[2] Formula	1489	1613	1866	2093	2391	2755	3013	2806
Alabama[3] Appropriation	1450	1705	1738	1853	2138	2105	2472	2331

[1]Source: SREB Data Exchange; FY 75-77 is for Cat. I-III institutions, FY 78-82 for Cat. I-IV institutions The FTE figures are also taken from Data Exchange. 81,82 $/FTE are from preliminary data.

[2,3]Source: ACHE; adjusted to include TRS/SS and exclude Vet. Med.

medicine for Auburn University for consistency with the SREB data exchange practices. The divergence of the trend between formula generated recommendations and the SREB regional average is evident as is the divergence between recommendations and appropriations.

Coincidental with the increased level of funding generated by the formula was an increasing disparity between the distribution of funds generated among the formula elements and the distribution of institutional expenditures. Although the formula was never intended to be used for the internal allocation of funds within an institution, the credibility of the model that it represents is enhanced by a closer approximation to expenditure patterns. Over the years the amount generated for instruction had increased relative to the amount generated for administration when compared with expenditure patterns. This was not simply a conceptual problem in an abstract formula, it was a practical problem on the campuses when the higher proportion for instruction was not allocated.

The Commission thus moved to correct these two problems in the 1981 formula.

1. Instruction

The Commission introduced a change in this element of the formula that affected both the level and distribution of the total recommendation while correcting the likely cause of the past overstatement of need. By using an average SREB faculty salary to arrive at an instructional multiplier, a policy adopted in 1975, and using this with weighting factors, double weighting in fact had been performed. (This is true since the average is already weighted in comparison with the lowest of the group).

The commission moved to SREB appropriations data as a basis for the instructional multiplier in order to generate a recommendation that would be at the regional average. The derived instructional multiplier was $35.04 per credit hour (general, undergraduate) as compared to $45.86 the previous year.

2. Academic Support

Research and Public Service were included in this formula element and the composite of 9.2 percent of instruction was included for this element. This value reflected no change in previous policy, simply a consolidation of elements.

3. Library Support

The 1979 factors were increased by 10 percent for each of two years to produce the 1981 values.

4. Student Services and General Institutional Support

a. General Administration and Student Services

b. Maintenance of Physical Plant and Custodial Services

d. Utilities

The same policies for these elements were continued. The 1979 values were increased by the factor 10 percent for each of two years to obtain the 1981 values.

c. General Institutional Expense

This formula element, included as a catchall for omissions in 1973, assumed the role of Institutional Support (NACUBO/NCHEMS) to include central administration, governance, etc., in 1981. The factor was increased to 14 percent of the sum of preceding elements (excluding utilities) to provide an internal distribution of funds

among the formula elements more consistent with the distribution of expenditures.

5. Tutition Adjustment

The same factor used in 1980 was used.

Program Elements

No changes were made in name or definition of the formula elements to bring them into agreement with the NACUBO/NCHEMS elements of expenditure, though, as noted above, the distribution assumed a one-to-one correlation between the elements.

Results of Changes

Fig. 1 also includes the data points for the 1981 formula recommendation, the appropriation and the SREB average. The changes in the formula for 1981 proved to be an excessive reduction resulting in an understatement of need. The recommendation was 5 percent below the original projected SREB average and 10 percent below the resulting regional average. The appropriation was 25 percent below the regional average.

Summary

The funding formula adopted by the Alabama Commission on Higher Education for 1973-75 was a direct descendant of that in use by the Texas Coordinating Board. Though not an exact replica, there were many clear similarities and close approximations. All formula elements in use by the Texas Board were translated into Alabama formula elements except Organized Research.

In 1975 the Alabama formula was expanded by the addition of an element for Research and Public Service. The amount added was modest, perhaps token. The 1975 Alabama formula brought the first major departure from the Texas formula. In this year the Alabama formula was tied to a regional standard by using the average faculty salary of the institutions in the Southern Regional Education Board's data exchange as a basis for the instructional multiplier. Also included in the formula that year was a deduction for tuition revenue, another departure from the Texas formula.

Research was increased as a formula element in 1976 but remained small in comparison to the element in the Texas formula. Public Service, not an element in the Texas formula, was broken out as a separate element in Alabama.

The tuition deduction for the 1975 and 1976 formulas had been a straight percentage factor determined from the average percentage of education and general revenues represented by tuition and fees. Starting in 1977 the deduction policy was changed to an amount determined from the average tuition charge per credit hour. That year also saw a change in the formula element for General Administration and

Student Services that further recognized diseconomies of scale for smaller institutions. The smaller schools received correspondingly more support on a per student basis than the larger schools.

The 1978 Alabama formula saw a still greater recognition of the problems of small institutions. The element for General Administration and Student Services was separated into two parts, one for institutions with headcount enrollments above 4,000 and the second for those institutions with enrollments 4,000 and below. For this later category a base of $300,000 was established for the first 1,000 students. As an adjunct to an effort towards quality enhancement, the tuition deduction was decreased to 90 percent of the average tuition charged, with the intent that the 10 percent retained be used for quality enhancement. Since the appropriations fell significantly short of the formula generated recommendation, no benefit was derived from the effort. The 90 percent factor, however, has been continued through the 1981 formula.

The 1981 formula contained several major changes in the Alabama formula. It was recognized that the average faculty salary used in constructing the instructional multiplier was already a weighted figure and that, when multiplied by weighted credit hours, double weighting had been performed. Steps were therefore taken to correct this error. General Institutional Expense was expanded to include central administration and governance, and the amount increased concomitantly. These two changes served to bring the formula generated recommendations more closely in line with regional appropriations and to provide a distribution among the formula elements more consistent with the distribution of expenditures.

Epilogue

The foregoing has been confined to a detailed description of the origins and evolution of the funding formula used by the Alabama Commission on Higher Education. The formula has been used as a guideline by the Commission in arriving at a final recommendation to the Governor and the Legislature for funding the regular academic programs in the universities. That it has only been a guideline is demonstrated by the observation that only once in the period 1973-81 has the Commission adopted, without change, the formula generated amount. The variance, however, from formula generated amounts has not exceeded three percent in this period.

It has not been a part of this work to assess the political effectiveness of the Alabama funding formula nor to make a technical evaluation. These are the subject of further research.

1973-74	1975-76	1976-77 (Critical Needs)	1977-78
1. Salaries for Instruction and Departmental Research $17.00/Wt.Cr.Hr.	1. Instruction Merged Wt. Factors $32.46/Wt.Cr.Hr.	1. Instruction 75-76 Wt. Factors $31.40/Wt.Cr.Hr.	1. Direct Instruction and Departmental Operating Expenses 75-76 Wt. Factors $35.10/Wt.Cr.Hr.
2. Departmental, Division Operating Expenses $2.00/Wt.Cr.Hr.			2. Academic Support (formerly Instructional Administration) 5% x 1
3. Instructional Administration	2. Research and Public Service 1% x 1	2. Research and Public Service 3% x 1	3. Research and Public Service Research 2% x (1+2) Public Service 2% x (1+2)
4. Libraries Rate/Cr.Hr. U.G. $ 2.00 G-1 $ 4.00 G-2 $17.00 Law $11.00	3. Academic Support (Libraries) Rate/Cr.Hr. U.G. $ 2.39 G-1 $ 4.79 G-2 $20.48 Law $12.64	3. Academic Support (Libraries) Rate/Cr.Hr. U.G. $ 2.53 G-1 $ 5.08 G-2 $21.71 (6% over 1975) Law $13.40	4. Library Support Rate/Cr.Hr. U.G. $ 2.66 G-1 $ 5.34 G-2 $22.84 (5.2% over 1976) Law $14.10
5. General Administration and Student Services Rate/Headcount 0 - 5,000 $100.00 5,000 - 10,000 $ 85.00 10,000+ $ 70.00	4. Student Services and General Institutional Support a. General Administration and Student Services Rate/Headcount 0 - 4,000 $122.01 4,000 - 8,000 $ 91.01 8,000+ $ 81.99	4. Student Services and General Institutional Support a. General Administration and Student Services Rate/Headcount 0 - 4,000 $129.33 4,000 - 8,000 $ 96.47 8,000+ $ 86.91 (6% over 1975)	5. Student Services and General Institutional Support a. General Administration and Student Services Rate/Headcount 0 - 1,000 $160.00 1,000 - 2,000 $136.00 2,000 - 4,000 $124.05 4,000 - 8,000 $101.49 8,000+ $ 91.43 (5.2% over 1976)
6. Maintenance of Physical Plant $.30/Gr.Sq.Ft.	b. Maintenance of Physical Plant and Custodial $.94/Gr.Sq.Ft.	b. Maintenance of Physical Plant and Custodial $1.50/Gr.Sq.Ft.	b. Maintenance of Physical Plant and Custodial $1.58/Gr.Sq.Ft. (5.2% over 1976)
7. Custodial $.30/Gr.Sq.Ft.			
8. General Institutional Expense 2% x (1+2...+7)	c. General Institutional Expense (1+2+...+4b) x 2%	General Institutional Expense (1+2+...+4b) x 2%	c. General Institutional Expense (1+2+...+5b) x 2%
9. Utilities Institutional Projected Cost	d. Utilities 85% x Estimated Cost	d. Utilities 1974-75 Cost/Gr.Sq.Ft. +10%(75-76) + 10%(76-77) x Projected Gr.Sq.Ft. for 1976-77	d. Utilities 1975-76 Cost/Gr.Sq.Ft. +10%+10% for inflation x Projected Gr.Sq.Ft. for 1977-78
10. Tuition Adjustment None	5. Tuition Adjustment (Deduct) 23.4% x (1+2+...+4d)	5. Tuition Adjustment (Deduct) $26% x (1+2+...+4d)	6. Tuition Adjustment (Deduct) $18.53/Cr.Hr. (Average Tuition)
		6. Override for critical needs formula minimum recommendation = 1975-76 appropriation	

1978-79	1979-80*	1980-81	1981-82
1. Direct Instruction and Departmental Operating Expenses 75-76 Wt. Factors $37.02/Wt.Cr.Hr.	1. Instruction 75-76 Wt. Factors $42.93/Wt.Cr.Hr.	1. Instruction 75-76 Wt. Factor $45.86/Wt.Cr.Hr.	1. Direct Instruction and Departmental Operating Expenses 1975-76 Wt. Factors $35.04/Wt.Cr.Hr.
2. Academic Support 5% x 1	2. Academic Support 5% x 1	2. Academic Support 5% x 1	2. Academic Support 9.2% x 1 (incl. 2% Res. & 2% P.S.)
3. Research and Public Service Research 2% x (1+2) Public Service 2% (1+2)	3. Research 2% x (1+2) 4. Public Service 2% x (1+2)	3. Research and Public Service 2% each of (1+2)	
4. Library Support Rate/Cr.Hr. U.G. $ 3.26 G-1 $ 6.60 G-2 $28.21 Law $17.41	5. Library Support Rate/Cr.Hr. U.G. $ 3.61 G-1 $ 7.26 (+10% over G-2 $31.03 1978) Law $19.15	4. Library Support Rate/Cr.Hr. U.G. $ 3.90 (All Factors G-1 $ 7.85 9%+9% over G-2 $33.50 1978-79) Law $20.70	3. Library Support Rate/Cr.Hr. U.G. $ 4.37 (All Factors G-1 $ 8.78 10%+10% over G-2 $37.55 1979-80) Law $23.17
5. Student Service and General Institutional Support a. General Administration and Student Services (Rate/Headcount) Under 4,000 Headcount 0 - 1,000 $300,000 Base 1,000 - 2,500 $150.96 2,500 - 4,000 $103.98 Over 4,000 Headcount 0 - 4,000 $170.60 4,000 - 8,000 $127.26 8,000+ $114.66	6. General Administration and Student Services (Rate/Headcount) Under 4,000 Headcount 0 - 1,000 $321,000 Base 1,000 - 2,500 $162.00 2,500 - 4,000 $111.00 Over 4,000 Headcount 0 - 4,000 $183.00 4,000 - 8,000 $136.00 8,000+ $123.00 (7% over 1978)	5. Student Services and General Institutional Support a. General Administration and Student Services (Rate/Headcount) Under 4,000 Headcount 0 - 1,000 $356,430 Base 1,000 - 2,500 $179.00 2,500 - 4,000 $124.00 Over 4,000 Headcount 0 - 4,000 $203.00 4,000 - 8,000 $151.00 8,000 $136.00	4. Student Services and General Institutional Support a. General Administration and Student Services (Rate/Headcount) Under 4,000 Headcount 0 - 1,000 $389,134 Base 1,000 - 2,500 $196.00 2,500 - 4,000 $134.00 Over 4,000 Headcount 0 - 4,000 $221.00 4,000 - 8,000 $165.00 8,000 $149.00
b. Maintenance of Physical Plant and Custodial Services $1.69/Gr.Sq.Ft.(7% over 1977)		b. Maintenance of Physical Plant and Custodial Services $2.00/Gr.Sq.Ft.	b. Maintenance of Physical Plant and Custodial Services $2.23/Gr.Sq.Ft.
c. General Institutional Expense (1+2+...+5b)	7. General Institutional Expense 2% x (1+...+6+8a)	c. General Institutional Expense 2% x (1+2...+5b)	c. General Institutional Expense 14% x (1+2...+4b)
d. Utilities 1976-77 Cost/Gr.Sq.Ft. +25%+20% inflation and proj. rate increases x projected Gr./Sq.Ft.	b. Utilities 78-79 Cost/Gr.Sq.Ft. 10%+10% x Proj. Gr.Sq.Ft.	d. Utilities 1978-79 Cost/Gr.Sq.Ft.+ 9%+9% inflation x projected 80-81 Gr.Sq.Ft.	d. Utilities 1979-80 Cost/Gr.Sq.Ft. x 10% +10% inflation x projected Gr.Sq.Ft. 1981-82
6. Tuition Adjustment (Deduct) 90% Average Tuition/Cr.Hr. ($16.66)	9. Tuition Adjustment (Deduct) 90% Average/Cr.Hr. ($17.68)	6. Tuition Adjustment (Deduct) 90% Average/Cr.Hr. ($19.40)	5. Tuition Adjustment (Deduct) 90% Average/Cr.Hr. ($19.40)

*Unofficial, unpublished--see narrative for the 1979 formula

A METHOD FOR EVALUATING FUNDING FORMULAE

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ABSTRACT

Four criteria are developed for evaluating funding formulae; level of funding, distribution by category of institution, distribution by size of institution and internal distribution. Actual past appropriations per student from SREB Data Exchange are projected for comparison with the results of six state formulae applied to the thirteen Alabama universities for FY 1983.

A METHOD FOR EVALUATING FUNDING FORMULAE

Background

The use of formulae in the development of state appropriations for higher education is relatively recent, having its beginnings with the California faculty-staffing formula used in the 1950's (Moss and Gaither, 1976). This formula, developed in 1951 and used to prepare the 1953-54 budget requests, is one of the "oldest and most important" (Miller, 1964, p. 54). Texas also first used a formula in 1951 for the purpose of determining teachers' salary appropriations (Miller, 1964).

Miller reported in 1964 that ten states had begun using formulae or cost analysis procedures since 1950. He also reported that, at that time, eight other states were using procedures similar to formulae while three other states were considering the adoption of formulae. An extensive study by Gross in 1973 found that the number of states employing budget formulae had grown to 25, while a 1977 review conducted by the Kentucky Council on Higher Education found that formulae were being used in 22 states (Kentucky Council, 1977). A 1978 study by the Southern Regional Education Board revealed that 12 of the 14 member states were using some type of formula mechanism in their funding process (Spence, 1978).

According to Hale and Rawson (1976), the need for new and better ways to determine the financial needs of colleges and universities and methods for distributing the available resources among institutions equitably, combined with public and governmental demands for increased accountability, spurred the need for more objective pro-

cedures. Gross also has noted that formula funding is more apt to be used in states with "either limited resources to commit to higher education or a large number of similar institutions vying for state dollars" (1979, p. 8).

One of the most attractive aspects of formula funding is the presentation of higher education's needs in a simple, objective, and quantifiable manner. However, a formula actually is more often a set of formulae representing the various activities of an institution. In some states separate formulae for each activity such as instruction, libraries, and building maintenance were developed and noted as a series of "formulas"; in other states the procedure known as the "formula" is comprised of "activity breakdowns," "factors," or "subformulas." However, most of those familiar with formula funding use the term "formula" to denote both situations (Miller, 1964, p. 7). In the final analysis formulae are simply a quantitative expression of a conceptual model of an institution used to predict future resource requirements.

The literature lists and discusses numerous advantages and disadvantages of formula funding. Some of the frequently mentioned benefits of the process include uniformity and ease in budget preparation and presentation (Moss and Gaither, 1976; Miller, 1964; Hale and Rawson, 1976); assistance in making comparisons among institutions, programs, and activities (Miller, 1964; Moss and Gaither, 1976); provision of a method of equitable distribution of funds among institutions (Miller, 1964; Hale and Rawson, 1976; Moss and Gaither, 1976); the limitation of political maneuvering among those institutions and various agencies and individuals involved in the funding process

(Millett, 1974; Gross, 1979; Moss and Gaither, 1976; Hale and Rawson, 1976); provision of a more adequate level of state support for all institutions (Moss and Gaither, 1976; Miller, 1964); provision of accountability to the public (Hale and Rawson, 1976); provision of a method of encouraging economic and efficient operation (Miller, 1964); and the provision of a "reasonably simple and understandable" basis for deciding appropriations (Millett, 1974). Among the disadvantages of formula usage are the problems of a linear approach to funding in a time when resources and numbers of students are stabilizing and decreasing (Moss and Gaither, 1976; Gross, 1979); the "leveling effect" on institutions and their quality (Hale and Rawson, 1976; Moss and Gaither, 1976; Gross, 1973, p. 99); the inability of formulae to make policy decisions (Miller, 1964); a discouragement to trying new and innovative programs (Hale and Rawson, 1976; Moss and Gaither, 1976); their involvement in the projection rather than the prediction of budgetary requirements (Miller, 1964); the tendency to allocate funds and encourage programs and practices that will produce maximum results under the formula (Hale and Rawson, 1976; Gross, 1979); and the misuse of the formula as an internal allocation tool (Hale and Rawson, 1976; Miller, 1964).

Numerous authors have suggested conceptual formula models dealing with individual formula components, such as university administration and support, physical plant operation and maintenance, and libraries, as well as formulae in the broader sense and simulations for the assessment of such models (Cox, 1980; Walton, 1967; Rawson, 1975; Stumph, 1969; Hale and Rawson, 1976). Others have offered criteria

for the evaluation of formulas, such as the recognition of the diverse financial needs of institutions (Gross, 1973; Miller, 1964; Stumph, 1969); recognition of varying costs of instruction related to disciplines and levels of programs (Gross, 1973); quantitative definability (Halstead, 1974; Gross, 1973; Miller, 1964); provision of equitable treatment for similar institutions (Gross, 1973; Stumph, 1969); flexibility (Gross, 1973; Halstead, 1974; Stumph, 1969); clarity and understandability (Gross, 1973; Halstead, 1974); application only to budget requests or appropriations rather than internal allocations (Gross, 1973; Stumph, 1969; Miller, 1964); facilitation of comparisons (Miller, 1963; Halstead, 1974); validity (Halstead, 1974); and adequacy for displaying institutional needs to the legislative and executive branches (Stumph, 1969).

There have been several efforts at comparing the results of various formulae as applied to a common set of institutions. Cox (1980) has evaluated the academic support portions of 11 state formulae by comparing their results for a hypothetical system of 11 institutions and noting variances in the distribution of funds as a function of work load. Hale and Rawson (1976) have developed a simulation process with interactive capabilities, and used this system to compare the results from four types of formulae when applied to the data from six universities in one state, noting that each produced a unique distribution of funds.

Evaluation Criteria

The above cited efforts notwithstanding, there has been little effort to compare formula generated funding recommendations/requests with external standards. The present work was initiated in support

of an effort by the Alabama Commission on Higher Education in early 1982 to provide a critical assessment of the formula then in use. Given that formulae represent models for projecting future funding requirements, an essential criterion for evaluation is the degree to which the models conform to the real world. The difficulty therein lies in defining what the real world is.

In this analysis two assumptions are made. The first is that the real world is represented by actual past allocations of state funds on a per student basis, averaged over a number of states. Within this assumption, it is further assumed that a formula should produce results that recognize institutional differences (i.e., research doctoral vs. masters, large vs. small), while simultaneously treating similar institutions in a like manner.

The second assumption made is that the primary importance lies in the institutional total generated rather than the amounts generated by each formula component, since, generally speaking, appropriations are for the total. Within this assumption, however, the distribution among program elements should coincide fairly closely with the general pattern of expenditures, for reasons of face validity if none other.

In summary this analysis provides a comparison of the level of funding generated, the distribution of funds by category of institution, the distribution of funds by size of institution, and the internal distribution among expenditure program elements.

The Southern Regional Education Board (SREB) Data Exchange (1972-1981) provides a data base uniquely suited for this analysis. The Data Exchange provides, on an annual basis, the enrollments (FTE) and appropriations for the institutions in each member state, by

category of institution. The categories used in this analysis are: Category I (100+ doctorates/year); Category II (0-100 doctorates/year); Category III (masters and bacalaureate only). Also critical to this analysis is the further condition that these SREB figures do not include first professional health programs. It is important to note that they do include retirement benefits. Since most formulae do not include retirement benefits, consideration must be given to this fact.

For this analysis the distinction between categories of institutions is represented by the ratio of the per student appropriation for doctoral institutions (Categories I and II combined) to the masters level institutions, determined from the average of this ratio for the years 1973-82. Table 1 shows this figure to be 1.177 (s=0.036). In assessing the level of appropriations (adequacy), the amount generated is compared to the projected SREB average appropriation per student. In this projection, enrollments were projected by a linear regression and appropriations by an annualized percent increase. These values also are shown in Table 1.

For the purpose of evaluating the internal distribution among components of the formulae, the work of the John Minter Associates was used. This work is a composite analysis of the total E&G expenditure patterns of 41 public four year institutions for 1979 (Ratio Analysis, 1980).

The data used in the formula calculations were those used for the Alabama universities in the formula calculations for 1982-83

appropriations by the Alabama Commission on Higher Education. Adequacy of the data base for the calculations was the sole criterion in selecting the five other formulae used.

Comments on the Formulae

All six formulae recognize differential expenditures by subject matter and level of instruction. Four of them, Alabama, A, B, and C, are similar in that they deal separately with formula elements that essentially conform to the NCES expenditure categories of Instruction, Academic Support (including Libraries), Student Services, Institutional Support, and Plant O&M. State D bases the entire formula on instruction, and proportionate amounts thereof, for other functions. State E utilizes a base appropriation and an inflation factor; however, the major portion is driven by credit hours. Tuition and/or other external revenues have been accounted for in all states except C. States A and C do not include utilities in the Plant O&M element of the formula, but consider them as a separate item. For consistency the utilities data from the Alabama formula were added for the Plant O&M of these states.

The Results

The Level of Funding

Table 1 summarizes the level and distribution of funds resulting from six formula calculations. Of the 13 Alabama universities, five fall in the doctoral category (SREB Categories I-II) and eight in the masters level category (SREB Category III).

TABLE 1

DISTRIBUTION OF FUNDS BY INSTITUTIONAL CATEGORY (SREB) FOR SIX STATE FORMULA CALCULATIONS FOR ALABAMA UNIVERSITIES

1982-83
($/FTE)

	State						SREB	
	A	B	C	D	E	Ala.	Projected Average [a]	Average Ratio [b]
Doctoral (I and II)	2951	3371	3629	3723	3132	2781	3065	
Masters (III)	2387	2668	2900	3614	2934	2342	2622	
Ratio	1.236	1.263	1.251	1.030	1.067	1.187	1.169	1.177 S=.036
Ratio; Approp. (Avg. 1980-82)	1.044	1.236	1.097	0.894	1.048	1.158		

---

a Projected from data 1975-82

b Average ratio for years 1975-82

The formulae of four states, B, C, D and E, produce levels of funding for both categories of institutions above the respective projected SREB averages. The formulae for Alabama and State A produce levels below the projected SREB average.

Distribution by Institutional Category

States A, B, C, and Alabama show a fund distribution ratio (doctoral to masters) equal to or greater than that of the regional average, indicating that these formulae recognize the additional resources required for advanced graduate work. It is interesting to note that in State B, and to a lesser extent in Alabama, previous appropriations also reflect this recognition. States D and E provide some slight differentiation. Although the formula for State D provides a slight differentiation, the actual past appropriations show a reverse differentiation.

Distribution by Institutional Size

Figures 1-6 display the funds generated on a per student basis for each of the 13 Alabama universities by the six state formulae as a function of enrollment, providing a measure of the sensitivity of the formulae to institutional size. The projected SREB values are also displayed for comparison. The SREB values have been corrected for retirement benefits, as have those in Table 1.

Figure 1, the State A formula results, clearly shows a sensitivity to size within the masters category of institutions, with institution 6, the smallest in the category, receiving a substantially higher level of funding. Institution 12, the next smallest, is similarly affected, but to a lesser degree. For the six institutions in this category with enrollments of over 3,000, the standard deviation of the $/FTE as a percent of the mean for the group is only 3 percent, indicating that this formula treats similar institutions in a like manner. As also shown in Table 1, the levels of funding for both categories are below the projected regional average.

Figure 2 for State B shows the same increase for the smaller schools in the masters category and also for the smallest institution in the doctoral category. The standard deviation of the $/FTE for the six masters level institutions is, in this case, 4 percent of the mean, demonstrating again similarity of treatment, but to a slightly lesser degree. As noted earlier the level produced is above the projected regional average.

Figure 3 for State C shows a significantly enhanced treatment of the smaller institutions in the masters category and again a fairly tight grouping of the six largest institutions in this category, with a

standard deviation for the $/FTE of 3.1 percent of the mean for the group. The levels, as noted earlier, are above the projected regional average.

Figure 4 for State D does not show the consistent sensitivity to size noted in the previous formulae. Institution 6, the smallest, receives a recommended $/FTE lower than the average of the six largest in the category. The spread in the $/FTE is larger, in this case 6.1 percent. Again, as noted earlier, the levels are above the regional average and the distribution ratio by type of institution is small, compared to the regional average.

Figure 5 for State E shows the sensitivity to institutional size, only slight differentiation by type of institution and a level above the projected regional average. The deviation among the six largest masters level institutions is 5.5 percent of the mean $/FTE, indicating less consistency in the treatment of similar institutions.

Figure 6, for the Alabama formula, shows the sensitivity to institutional size within the masters level category and differentiation by type of institution. The spread in the $/FTE for the six largest masters level institutions is 6.0 percent, indicating some inconsistency in the treatment of similar institutions.

Distribution Among Formula Elements

The internal distribution of resources among formula elements is generally less important than the institutional total generated. This is true since appropriations generally deal only with totals. A notable exception to this generalization is found in Texas, where certain appropriations for formula elements are non-transferable, e.g., faculty salaries and library support. The potential for such

Distribution by Institutional Size

Figures 1-6 display the funds generated on a per student basis for each of the 13 Alabama universities by the six state formulae as a function of enrollment, providing a measure of the sensitivity of the formulae to institutional size. The projected SREB values are also displayed for comparison. The SREB values have been corrected for retirement benefits, as have those in Table 1.

Figure 1, the State A formula results, clearly shows a sensitivity to size within the masters category of institutions, with institution 6, the smallest in the category, receiving a substantially higher level of funding. Institution 12, the next smallest, is similarly affected, but to a lesser degree. For the six institutions in this category with enrollments of over 3,000, the standard deviation of the $/FTE as a percent of the mean for the group is only 3 percent, indicating that this formula treats similar institutions in a like manner. As also shown in Table 1, the levels of funding for both categories are below the projected regional average.

Figure 2 for State B shows the same increase for the smaller schools in the masters category and also for the smallest institution in the doctoral category. The standard deviation of the $/FTE for the six masters level institutions is, in this case, 4 percent of the mean, demonstrating again similarity of treatment, but to a slightly lesser degree. As noted earlier the level produced is above the projected regional average.

Figure 3 for State C shows a significantly enhanced treatment of the smaller institutions in the masters category and again a fairly tight grouping of the six largest institutions in this category, with a

standard deviation for the $/FTE of 3.1 percent of the mean for the group. The levels, as noted earlier, are above the projected regional average.

Figure 4 for State D does not show the consistent sensitivity to size noted in the previous formulae. Institution 6, the smallest, receives a recommended $/FTE lower than the average of the six largest in the category. The spread in the $/FTE is larger, in this case 6.1 percent. Again, as noted earlier, the levels are above the regional average and the distribution ratio by type of institution is small, compared to the regional average.

Figure 5 for State E shows the sensitivity to institutional size, only slight differentiation by type of institution and a level above the projected regional average. The deviation among the six largest masters level institutions is 5.5 percent of the mean $/FTE, indicating less consistency in the treatment of similar institutions.

Figure 6, for the Alabama formula, shows the sensitivity to institutional size within the masters level category and differentiation by type of institution. The spread in the $/FTE for the six largest masters level institutions is 6.0 percent, indicating some inconsistency in the treatment of similar institutions.

Distribution Among Formula Elements

The internal distribution of resources among formula elements is generally less important than the institutional total generated. This is true since appropriations generally deal only with totals. A notable exception to this generalization is found in Texas, where certain appropriations for formula elements are non-transferable, e.g., faculty salaries and library support. The potential for such

legislative attention to individual formula elements has long been one of the main concerns of those critics of formula funding who fear the loss of institutional authority in the internal allocation of resources. Nevertheless, any formula that generates funding requirements by recognizable expenditure program elements should do so in a manner consistent with recognized expenditure patterns. From the point of view of political pragmatism, this is essential for minimal face validity.

Table 2 shows the internal distribution of resources generated among the recognized NCES expenditure categories for the four of the six state formulae that generate resource needs by these expenditure categories. For comparison the results of the John Minter Associates for 41 public four year institutions (Ratio Analysis, 1980) are also shown. The high and low represent the upper and lower decile of the distribution. Each of the formulae produce a distribution that is within the high and low, with the exception of Instruction and Institutional Support for State C, which are above and below the upper and

TABLE 2

DISTRIBUTION OF FUNDS AMONG FORMULA ELEMENTS FOR
SIX STATE FORMULA CALCULATIONS FOR ALABAMA UNIVERSITIES

1982-83
(%)

Formula Element	State						FMM-JMA[a]		
	A	B	C	D	E	Ala.	Mean	High	Low
Instruction	66.4	54.0	57.6	N/A	N/A	53.7	49.2	56.5	38.8
Academic Support		11.9	10.2			10.2	10.4	15.0	6.2
Student Services	4.0	6.0	6.5			6.8	5.8	9.2	3.5
Plant O&M	13.8	14.0	24.1			17.6	11.2	16.0	6.8
Institutional Support	6.5	13.04	1.6			11.4	10.6	14.9	6.4

a 41 public four-year institutions
"Ratio Analysis in Higher Education", Peat, Marwick, Mitchell & Co. with John Minter Associates, 1980

lower bounds respectively. The only clear trend is that all four formulae tend to be high in Instruction and Plant O&M. The latter may in part be the product of the assumption mentioned previously in treating utilities for States A and C as they were treated in the Alabama formula.

Discussion

The results cited above should be considered tentative since the appropriate agencies for the five states, A-E, have not yet had an opportunity to review the application of their particular formula to the data for the Alabama universities. Any errors that may have occurred in the calculations would not, however, affect the utility of the above described method for evaluating a funding formula, but would only alter some of the observations. It should also be noted that the value of the method proposed is not limited to the evaluation of formula funding methods, but also to all other methods of generating funding recommendations or requests, so long as they produce results in a compatible form.

The advantages of the SREB Data Exchange have been cited. It is also therefore equally appropriate to mention some of the disadvantages. These lie largely in the data for Categories II and III institutions. Category I institutions are generally older, more established doctoral granting institutions, characteristically "the state university" or "the state land-grant university." As such their funding patterns are relatively stable and consistent. Category II institutions are largely newer institutions with growing but small doctoral programs, sometimes strongly influenced, if not dominated, by the presence of an academic health science center. Their funding patterns tend to be

erratic when taken over the regional average. In several states the Category III institutions include some institutions that are upper-division and graduate (masters) only, with correspondingly higher appropriations per student. In this analysis all of these factors have been considered and the effects eliminated, to the extent possible.

The extension of this type of analysis to the HEGIS data base would be extremely valuable for one important reason. The selection of the regional average, as reflected by the SREB Data Exchange, for comparison is in fact the selection of a peer group. For some purposes it may not be the best peer group. It would be a distinct advantage to be able to select a differently structured peer group, a real possibility with the HEGIS data base. At present, however, it is not possible to remove the influence of the first professional health programs on the appropriations and expenditures as reported to HEGIS. Any steps that could be taken to remedy this difficulty would be of great benefit, not only to those studying the financing of the "regular academic programs" in higher education, but also those studying the financing of medical and other first professional health related programs.

Acknowledgements

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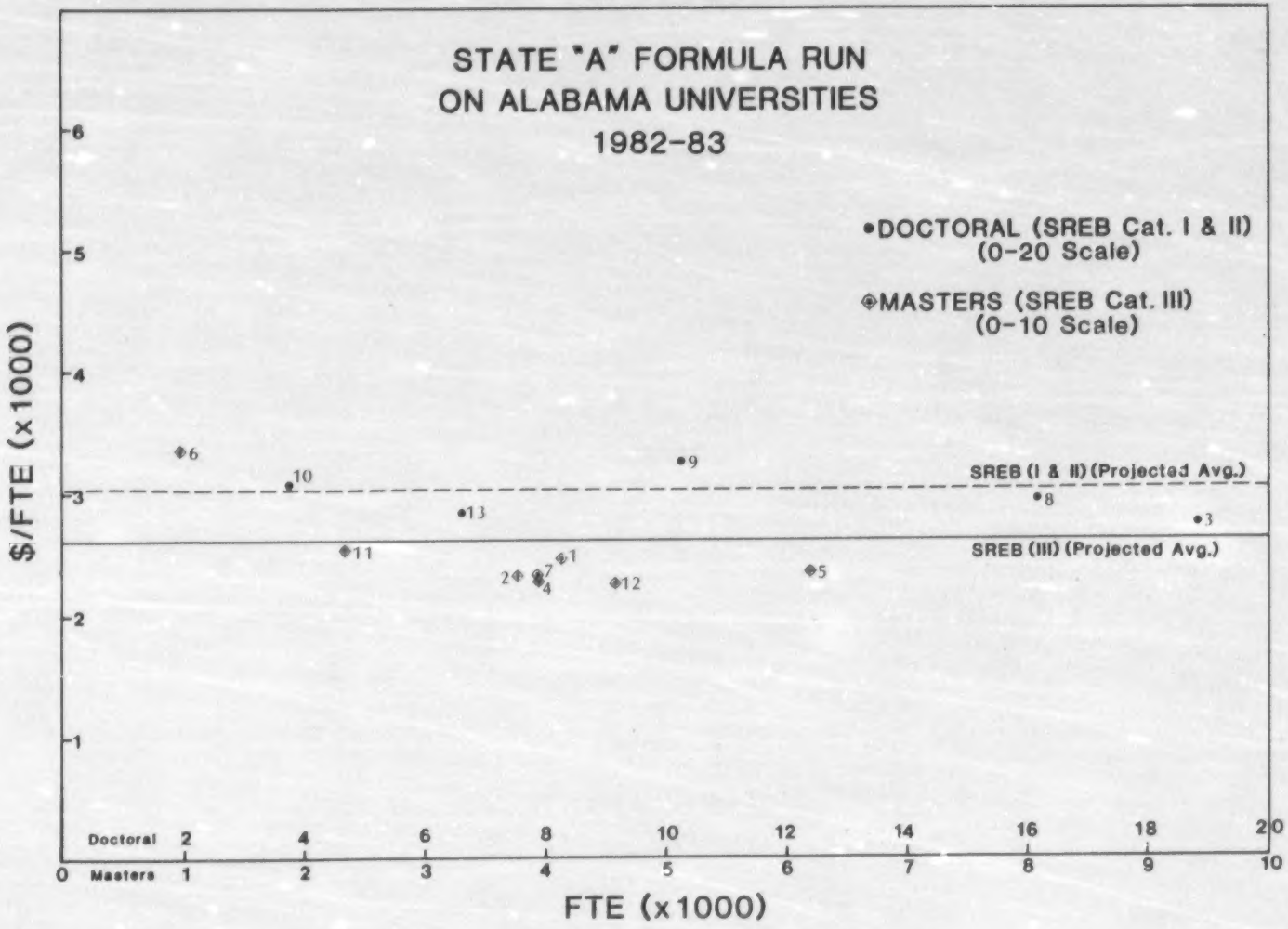
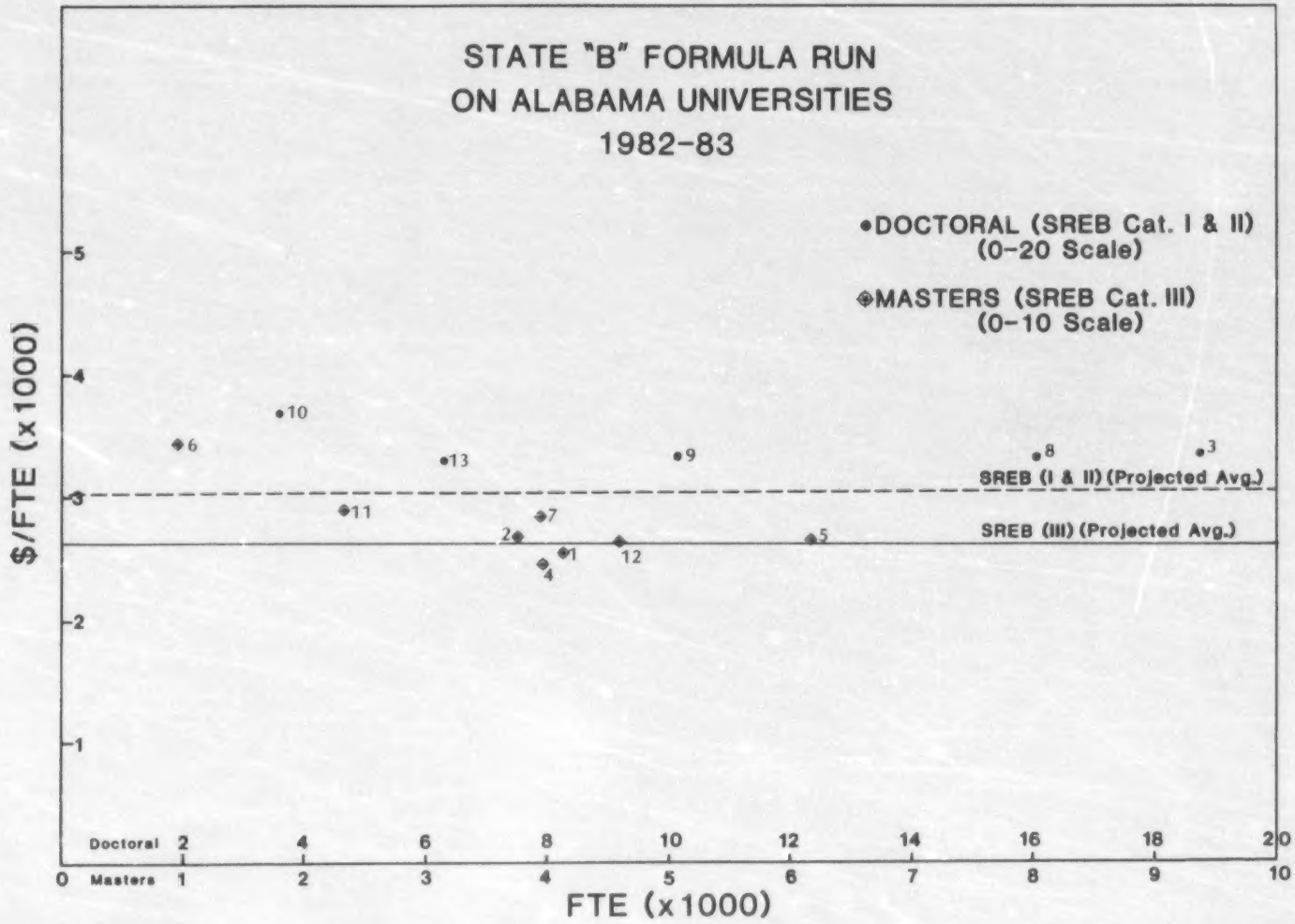
also like to expresss our sincere appreciation to those anonymous individuals in States A-E, without whose assistance and sufferance this work would not have been possible.


STATE "A" FORMULA RUN
ON ALABAMA UNIVERSITIES
1982-83
•DOCTORAL (SREB Cat. I & II)
(0-20 Scale)
◈MASTERS (SREB Cat. III)
(0-10 Scale)
SREB (I & II) (Projected Avg.)
SREB (III) (Projected Avg.)
$/FTE (x1000)
FTE (x1000)
Doctoral
Masters

-67-

FIGURE 1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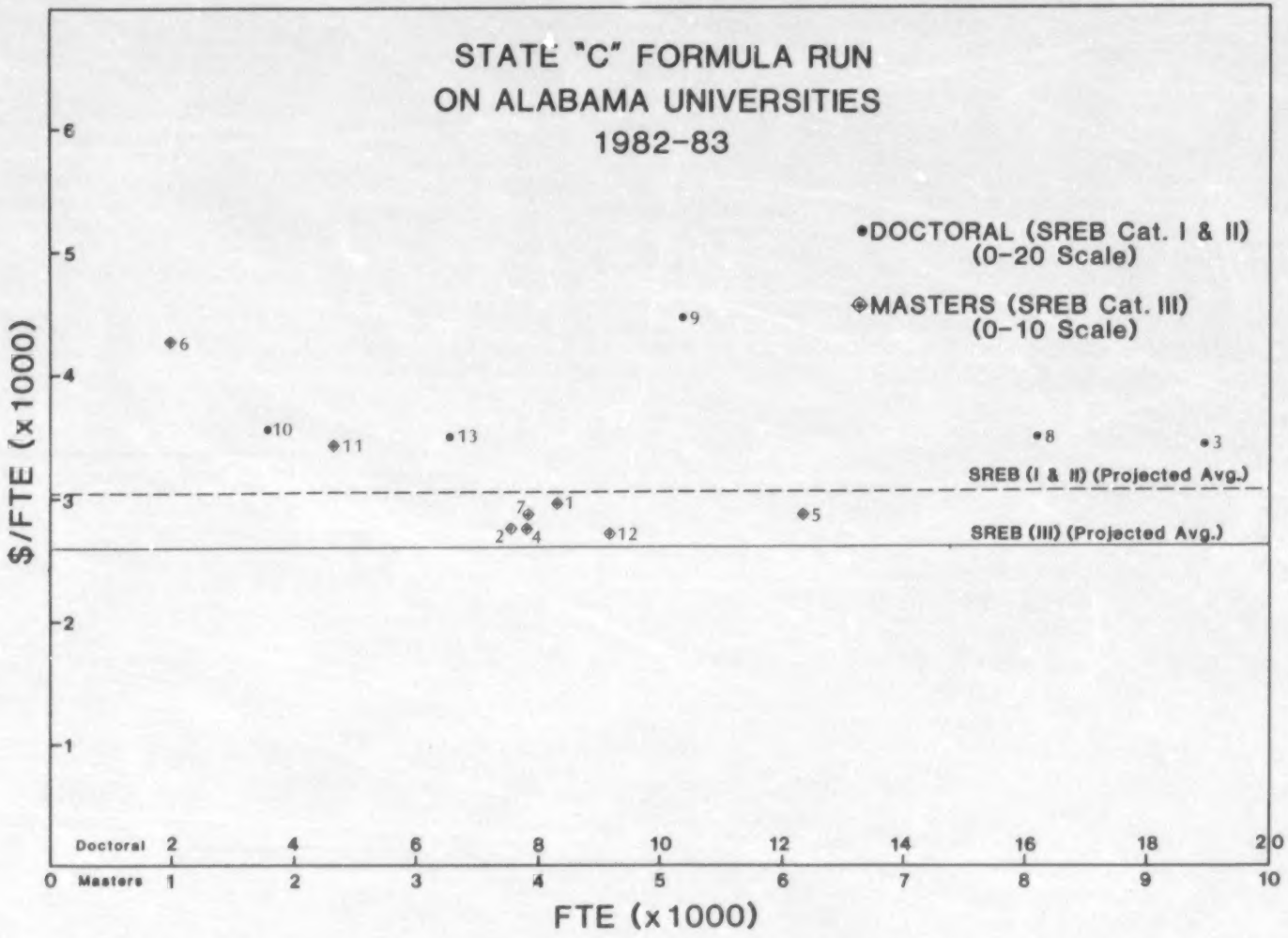
ON ALABAMA UNIVERSITIES
1982-83
•DOCTORAL (SREB Cat. I & II)
(0-20 Scale)
◆MASTERS (SREB Cat. III)
(0-10 Scale)
$/FTE (x1000)
SREB (I & II) (Projected Avg.)
SREB (III) (Projected Avg.)
Doctoral
Masters
FTE (x1000)

FIGURE 2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ON ALABAMA UNIVERSITIES
1982-83
•DOCTORAL (SREB Cat. I & II)
(0-20 Scale)
◈MASTERS (SREB Cat. III)
(0-10 Scale)
SREB (I & II) (Projected Avg.)
SREB (III) (Projected Avg.)
$/FTE (x1000)
FTE (x1000)
Doctoral
Masters

FIGURE 3

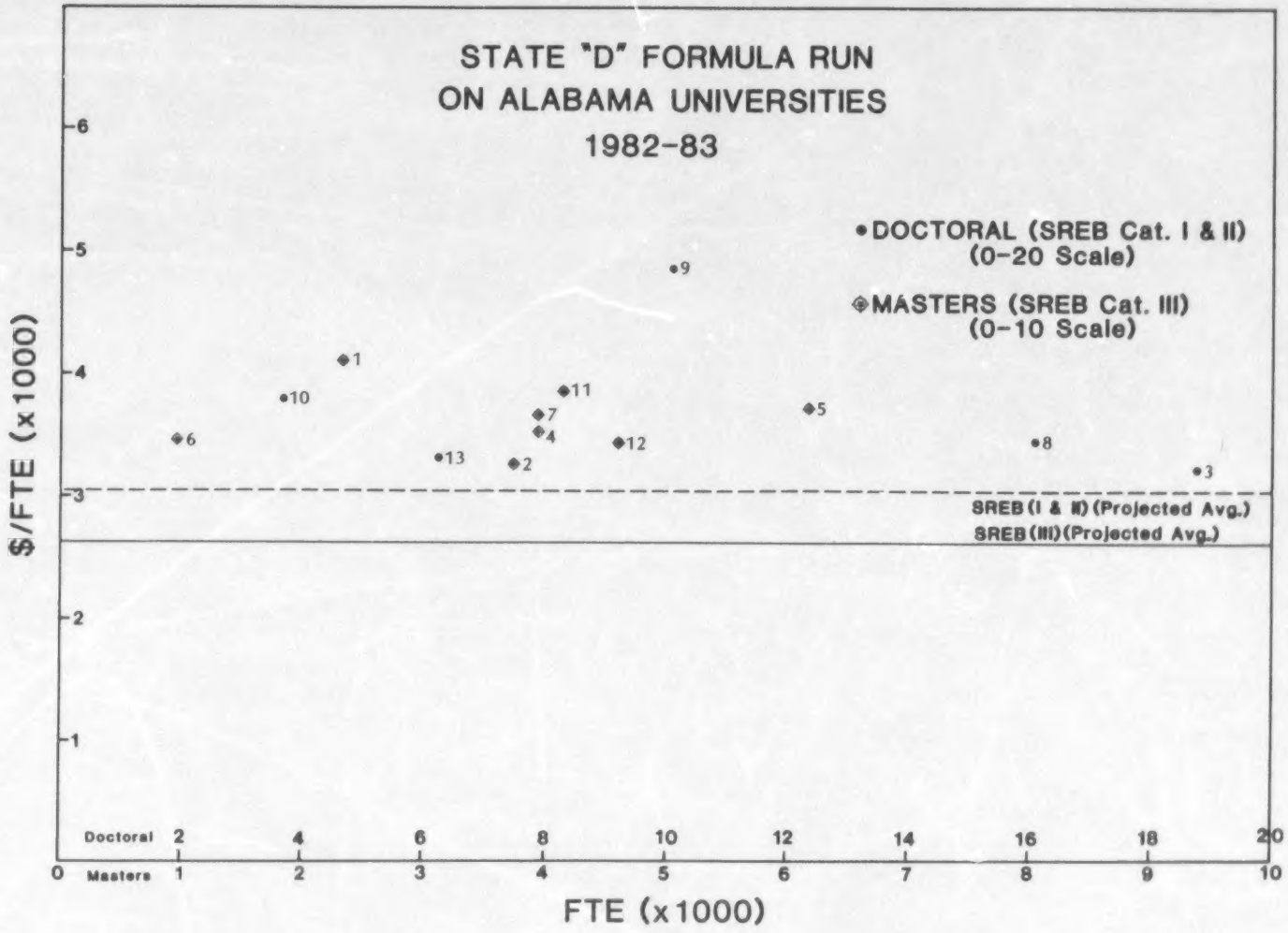
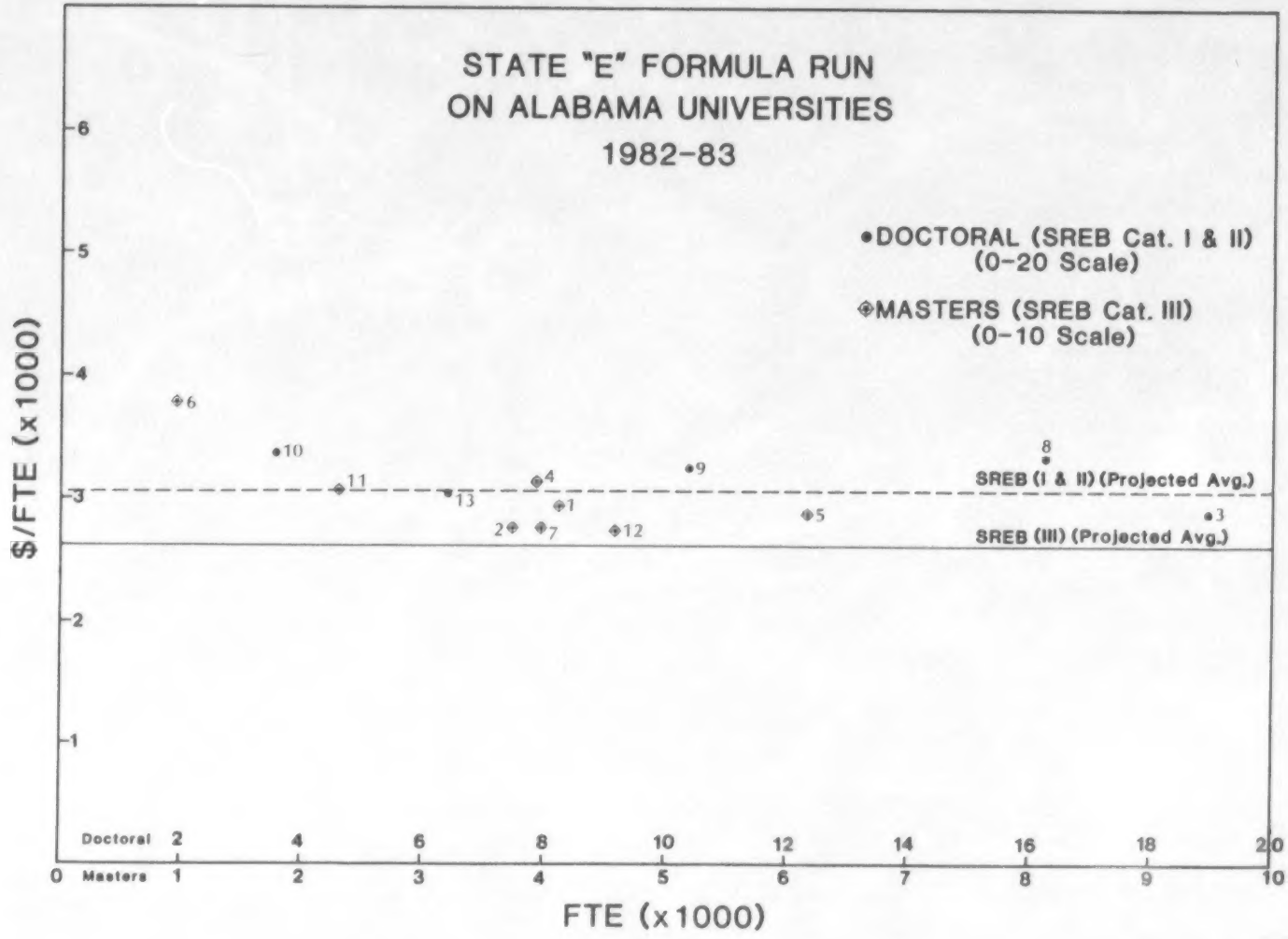

STATE "D" FORMULA RUN
ON ALABAMA UNIVERSITIES
1982-83
•DOCTORAL (SREB Cat. I & II)
(0-20 Scale)
◆MASTERS (SREB Cat. III)
(0-10 Scale)
$/FTE (x1000)
FTE (x1000)
SREB (I & II) (Projected Avg.)
SREB (III) (Projected Avg.)
Doctoral
Masters

FIGURE 4


STATE "E" FORMULA RUN
ON ALABAMA UNIVERSITIES
1982-83
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(0-20 Scale)
⊕MASTERS (SREB Cat. III)
(0-10 Scale)
SREB (I & II) (Projected Avg.)
SREB (III) (Projected Avg.)
$/FTE (x1000)
FTE (x1000)
Doctoral
Masters

FIGURE 5

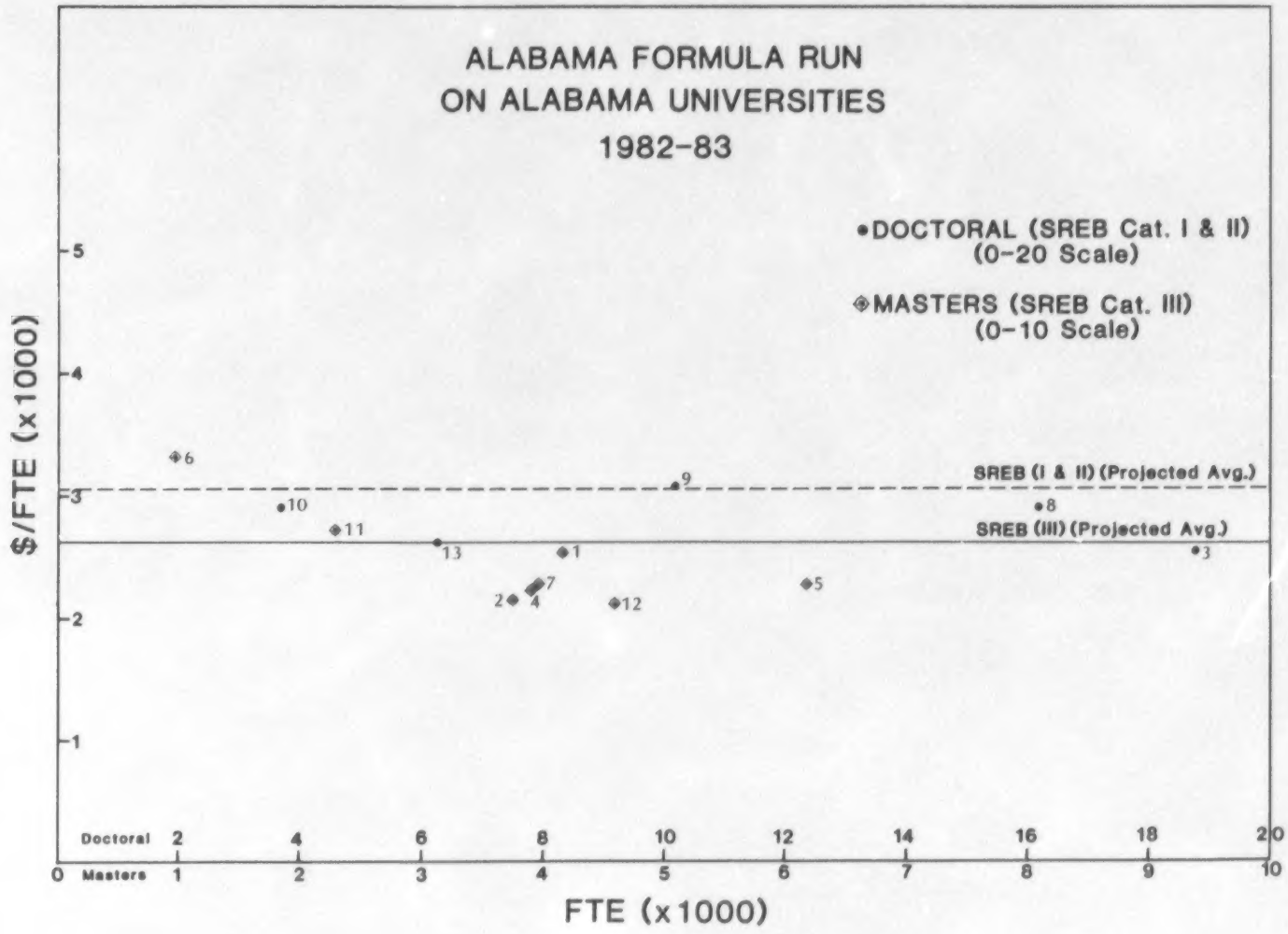
ALABAMA FORMULA RUN
ON ALABAMA UNIVERSITIES
1982-83
•DOCTORAL (SREB Cat. I & II)
(0-20 Scale)
◈MASTERS (SREB Cat. III)
(0-10 Scale)
SREB (I & II) (Projected Avg.)
SREB (III) (Projected Avg.)
$/FTE (x1000)
FTE (x1000)
Doctoral
Masters

FIGURE 6

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